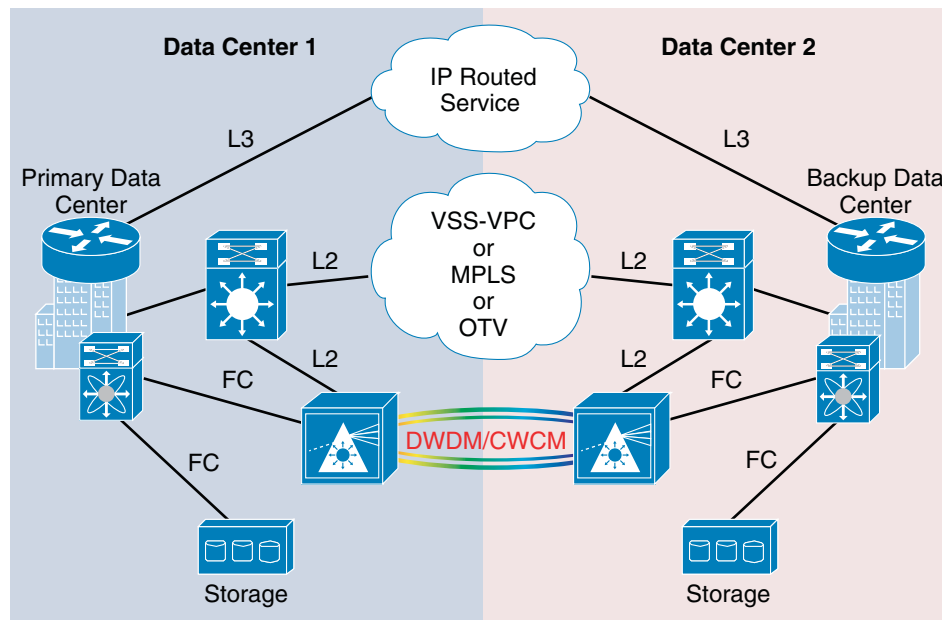


Data Center Interconnect Solution

The term DCI (Data Center Interconnect) is relevant in all scenarios where different levels of connectivity are required between two or more data center locations in order to provide flexibility for deploying applications and resiliency schemes.

Figure 1 DCI Overview



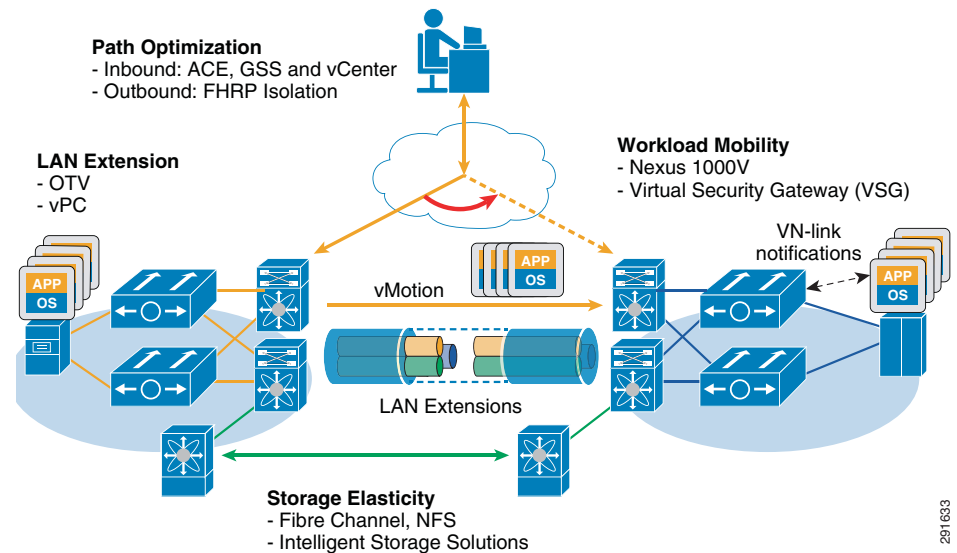
DCI Components

- LAN Extension—Provides a single Layer 2 domain across data centers. Layer 2 extension provides a transparent mechanism to distribute the physical resources required by some application frameworks such as the mobility of the active machine (virtual or physical).
- Path Optimization—Optimizes client-server traffic flow between the external client and internal server. As virtual machines are stretched between data center locations, path optimization enables efficient traffic patterns.
- Layer 3 Extension—Provides routed connectivity between data centers used for segmentation/virtualization and file server backup applications. This may be Layer 3 VPN-based connectivity, and may require bandwidth and QoS considerations.
- SAN Extension—Integrates Fibre Channel, Fibre Channel over IP, NAS IP Filers, and other protocols into the overall DCI framework to maintain continuous data availability.

Virtualized Workload Mobility Use Case

The ability to move workloads between physical locations over a Data Center Interconnect has been a goal of progressive IT departments since the introduction of virtualized server environments and increases the flexibility and agility of entities with new use case opportunities.

Figure 2 Virtualized Workload Mobility Overview



Virtualized Workload Mobility Enables

Data Center Capacity Expansion and/or Consolidation

Applications need to be migrated from one data center to another without business downtime as part of data center migration, maintenance, or consolidation efforts. Virtual machines need to be migrated to a secondary data center as part of data center expansion to address power, cooling, and space constraints in the primary data center.

Virtualized Server Resource Distribution Over Distance

Virtual machines need to be migrated between data centers to provide compute power from data centers closer to the clients (follow the sun) or to load balance across multiple sites.

Disaster Planning Strategies, including Disaster Avoidance Scenarios

Data centers in the path of natural calamities (such as hurricanes) need to proactively migrate the mission-critical application environment to another data center.

Virtualized Workload Mobility Solution Components

The DCI solution is modular, allowing new technologies and advancements to be seamlessly inserted into the Virtualized Workload Mobility case.

LAN Extension (Two Options in this Solution)

- Option A—Layer 2 dynamic MAC encapsulation in IP using Overlay Transport Virtualization (OTV) on the Nexus 7000
- Option B—Native Layer 2 Ethernet extension using Virtual Port Channels (vPC) on the Nexus 7000

Path Optimization

- Ingress Optimization—DNS-based resolution with the Cisco Global Site Selector (GSS), Application Control Engine (ACE), and integration with VMware vCenter.
Note: LISP is a new option on the Nexus 7000 with NX-OS 5.2.
- Egress Optimization—First Hop Redundancy Protocol with HSRP Localization on the Nexus 7000

Virtualization/Workloads

- Nexus 1000v—Stretched cluster support with stateful Port Profile mobility, including QoS, Port Security, and Statistics. Virtual Supervisor Module (VSM) and Virtual Ethernet Module (VEM) distributed over 100 kilometers.
- Virtual Security Gateway—Stretched cluster support with Stateful Security Profile mobility, including stateful firewall, zoning, and protection over 100 kilometers. Innovative vPath technology embedded in virtual machine VEM forwarding logic for optimized VSG performance.
- VMware vCenter and ESXi 4.1—VMware strategic partnership using the ESXi 4.1 Hypervisor for virtualizing physical servers and vCenter for virtualization management and workflow integration with the ACE/GSS for Ingress Path Optimization. VMware vMotion technology for virtual machine mobility.

Storage Elasticity with NetApp

- Shared Storage Model—NetApp strategic partnership using NetApp vFiler for NFS storage access carried through IP. Using the NetApp vFiler system, the storage traffic utilizes the existing DCI connection, shared with OTV and other protocols.

For more information about DCI, see:

- http://www.cisco.com/en/US/docs/solutions/Enterprise/Data_Center/DCI/4.0/Netapp/dciNetapp.html
- http://www.cisco.com/en/US/solutions/ns340/ns414/ns742/ns743/ns749/landing_site_selection.html
- <http://www.cisco.com/go/dci>

Contact: Jake Howering, jhowerin@cisco.com, DCI Product Manager.

- Intelligent Storage Solutions—NetApp FlexCache is a caching technology that enables an Active/Cache virtualized data center. The remote data center FlexCache volume uses attribute cache time-outs to reduce chances of stale data in the FlexCache volume and optimize client storage content requests.

Virtualized Workload Mobility Use Case Criteria

The boundaries of Virtualized Workload Mobility are derived from within the scope of the solution components and use case.

- Live Migration—A live virtual machine migration requires a Hypervisor layer and VMware ESXi 4.1 is selected. VMware vMotion has a 5 millisecond latency requirement that translates to approximately 100-400 kilometers.
- Non-Disruptive—Existing and new server transactions must be maintained before, during and after the Virtualized Workload Mobility migration.
- Continuous Data Availability—Storage content must be accessible wherever the virtual machine is located, which requires intelligent storage solutions, including the NetApp FlexCache System for intelligent caching management.

Figure 3 Virtualized Workload Mobility Solution Components

